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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,483	04/12/2004	Avto Tavkhelidze		4951

7590 07/12/2006
Borealis Technical Limited
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EXAMINER

TAMAI, KARL I

ART UNIT PAPER NUMBER

2834

DATE MAILED: 07/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/823,483	Applicant(s) TAVKHELIDZE ET AL.	
	Examiner Tamai I.E. Karl	Art Unit 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 09 May 2006.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
 - 4a) Of the above claim(s) 15-20 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-14 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 12 April 2004 is/are: a) accepted or b) objected to by the Examiner.
 - Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 - Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 - 1. Certified copies of the priority documents have been received.
 - 2. Certified copies of the priority documents have been received in Application No. _____.
 - 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 - * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____

DETAILED ACTION

Election/Restrictions

1. This application contains claims 15-20 drawn to an invention nonelected without traverse in Paper dated 12/13/2005. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 2834

4. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shakouri et al. (Shakouri)(US 5955772) and DiMatteo (US 6232546). Shakouri teaches vacuum thermionic heat pump with a cathode and anode 12, 16 spaced from each other across a vacuum 14, and an external circuit with a power source. Shakouri teaches every aspect of the invention but does not teach a positioning means for positioning the electrodes. DiMatteo teaches a capacitor sensors and piezoelectric actuators 20 and 22 to position the electrodes in a thermal energy transfer device. DiMatteo individual control of the actuators to provide consistent power transfer. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the heat pump of Shakouri with the actuator of DiMatteo to selectively control the space/energy transfer between the panels as taught by DiMatteo.

5. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shakouri et al. (Shakouri)(US 5955772) and DiMatteo (US 6232546), in further view of Richards (US 4281280). Shakouri and DiMatteo teach every aspect of the invention except the inert gas argon between the electrodes. Shakouri teaches that Richards teaches the region between the electrodes can be either evacuated or filled with an inert gas such as argon to transport energy from the emitter to the collector. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the machine of Shakouri and DiMatteo with the region between the electrodes being evacuated or filled with argon because Richards teaches that the vacuum or argon allows the transportation of electrons from the cathode to the anode, and

Art Unit: 2834

because it has been held that selection of know equivalents is within the ordinary skill in the art.

6. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shakouri et al. (Shakouri)(US 5955772) and DiMatteo (US 6232546), and Huffman ("Preliminary Investigations of a Thermotunnel Converter"). Shakouri and DiMatteo teach every aspect of the invention except the electrons tunneling between the emitter and collector, and the spacing being within 200 angstroms (claims 11-14). Huffman teaches the closing spaced electrodes causes a qualitative increase in the operation of thermionic devices, such as 10 angstroms. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the heat pump of Shakouri and DiMatteo with the spacing of 10 angstroms causing tunneling to improve the qualitative operation of the device as taught by Huffman.

Response to Arguments

Applicant's arguments filed 5/9/2006 have been fully considered but they are not persuasive. Applicant's argument that there is no motivation to combine Shakouri and DiMatteo is not persuasive. Shakouri teaches a thermionic cooler or generator (col. 1, line 17). DiMatteo teaches that in generators the submicron gap is hard to maintain, and that piezoelectric actuator (col. 3, line 5) can be used to control the gap and enhance performance (col. 1, line 27). The teaching of enhanced gap control is clear and literal motivation to combine the references.

Art Unit: 2834

Applicant's argument that there is no expectation of success is not persuasive. The examiner notes that only a reasonable expectation of success, not absolute predictability, is necessary for a conclusion of obviousness. *In re Longi*, 759 F.2d 887, 897, 225 USPQ 645, 651-52 (Fed. Cir. 1985). Moreover, the question relating to a "reasonable expectation of success" occurs most often in arts in which there may be more reason to question expectations unlike the instant situation where the expectation relates to mechanical and electrical components. The level of predictability in the mechanical and electrical arts is recognized as being relatively high. (See *In re Honan*, 559 F.2d 595, 606, 194 USPQ 527, 537-38 (CCPA 1977) (taking notice of the high level of predictability in mechanical or electrical environments and the lower level of predictability expected in chemical reactions and physiological activity)). The expectations of success are high because the both Shakouri and DiMatteo are in the electromechanical arts.

Applicant's argument regarding the shortcomings of Huffman is not persuasive because the claims are deemed unpatentable over the combination of Huffman, Shakouri, and DiMatteo not Huffman alone. The Applicant cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl I.E. Tamai whose telephone number is (571) 272 - 2036.

The examiner can be normally contacted on Monday through Friday from 8:00 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Darren Schuberg, can be reached at (571) 272 - 2044. The facsimile number for the Group is (571) 273 - 8300.

Art Unit: 2834

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Karl I Tamai
PRIMARY PATENT EXAMINER
July 7, 2006



KARL TAMAI
PRIMARY EXAMINER